



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,140	01/28/2004	Masao Miyamura	248212US2	9714
22850 7590 09/10/2007 OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER BAND, MICHAEL A	
			ART UNIT 1753	PAPER NUMBER
			NOTIFICATION DATE 09/10/2007	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No.	Applicant(s)	
	10/765,140	MIYAMURA, MASAO	
	Examiner	Art Unit	
	Michael Band	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 July 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) 9-12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 July 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Rauschnabel et al (WO 99/63129), citations below from English language equivalent (US Patent No. 6,613,393).

With respect to claim 1, Rauschnabel '393 discloses a sputtering method with a vacuum chamber (col. 5, lines 15-20), a cylindrical substrate holder (figure 4, turntable 60) (It is noted that an error in figure 4 lists the turntable as part 50. Col 7, line 16 states that the turntable should be part 60) with the substrate mounted on the outer periphery of a thin cylindrical surface (figure 4, parts 41 and 50; figure 5, parts 41 and 50). The vacuum chamber is divided into four compartments, with two (figure 4, parts 47 and 48; col. 7, lines 12-15) having gas supplied to them (i.e. sputter deposition compartments). Rauschnabel '393 depicts figure 5 as a section along line V-V through the apparatus according to figure 4. Figure 5 further illustrates two sets of cathodes and targets (parts 52 and 53) in separate compartments separated by a partition (part 54). The partition can also be seen in figure 5 separating the middle of the turntable (part 60). Figure 5

Art Unit: 1753

also shows two sets of gas inlets (parts 44 and 51) that can be seen entering each of the separate compartments to generate separate plasmas (col. 7, lines 15-23).

With respect to claim 2, Rauschnabel '393 further discloses that DC magnetron sputtering, pulsed magnetron sputtering, or double-cathode sputtering can be used (col. 3, lines 33-41).

With respect to claim 3, Rauschnabel '393 further discloses a cathode shutter to more accurately adjust the composition of the layer component that is deposited by sputtering (col. 5, lines 2-4).

With respect to claim 4, Rauschnabel '393 further discloses a plasma generator using microwave discharge (col. 2, lines 43-48). Rauschnabel '393 also discloses that in addition to microwave plasma, bias voltages can also either be used in conjunction with the microwave plasma or solely by itself (col. 3, lines 11-16). Rauschnabel '393 further states that "high frequency bias voltages have proven particularly effective in this context (col. 3, lines 16-18).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1753

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rauschnabel et al (WO 99/63129), citations below from English language equivalent (US Patent No. 6,613,393) in view of Miller et al (US Patent No. 6,627,050).

With respect to claim 5, Rauschnabel '393 discloses a sputtering method with a vacuum chamber (col. 5, lines 15-20), a cylindrical substrate holder (figure 4, turntable 60) (It is noted that an error in figure 4 lists the turntable as part 50. Col 7, line 16 states that the turntable should be part 60) with the substrate mounted on the outer periphery of a thin cylindrical surface (figure 4, parts 41 and 50; figure 5, parts 41 and 50). The vacuum chamber is divided into four compartments, with two (figure 4, parts 47 and 48; col. 7, lines 12-15) having gas supplied to them (i.e. sputter deposition compartments). Rauschnabel '393 depicts figure 5 as a section along line V-V through the apparatus according to figure 4. Figure 5 further illustrates two sets of cathodes and targets (parts 52 and 53) in separate compartments separated by a partition (part 54). The partition can also be seen in figure 5 separating the middle of the turntable (part 60). Figure 5 also shows two sets of gas inlets (parts 44 and 51) that can be seen entering each of the separate compartments to generate separate plasmas (col. 7, lines 15-23).

Art Unit: 1753

Furthermore Rauschnabel '393 discloses that greater separation between process gas atmospheres by pumping down the chamber between processes (col. 5, lines 9-14). In addition, Rauschnabel '393 also states that the vacuum chamber is compartmentalized to manage fresh gas and exhaust gas flows leading to a superior separation of the processes by controlled adaptation to the desired stoichiometry (col. 5, lines 15-22). However Rauschnabel '393 is limited in that while exhaust systems are discussed, it is not suggested as to the placement of said exhaust systems.

Miller '050 teaches a physical vapor deposition chamber that is also capable of being used with chemical vapor deposition (abstract; col. 4, lines 23-30). Miller '050 depicts in figure 2 a substrate pedestal (part 62) in a vacuum chamber (part 52) that includes side gas sources (parts 114 and 115) with a target (i.e. cathode) (part 56) located near a plasma density (part 138). Also depicted in figure 2 near a side wall is a vacuum pump system (part 120).

It would have been obvious to one of ordinary skill in the art to use the location of the vacuum pump system of Miller '050 for the disclosed vacuum port of Rauschnabel '393 since Rauschnabel '393 fails to specify a location. Because both references teach exhaust (i.e. vacuum) systems in similar devices, it would be obvious to substitute the particulars of one into the other to achieve the predictable result of evacuating the chamber.

With respect to claim 6, modified Rauschnabel '393 further discloses that DC magnetron sputtering, pulsed magnetron sputtering, or double-cathode sputtering can be used (col. 3, lines 33-41).

With respect to claim 7, modified Rauschnabel '393 further discloses a cathode shutter to more accurately adjust the composition of the layer component that is deposited by sputtering (col. 5, lines 2-4).

With respect to claim 8, modified Rauschnabel '393 further discloses a plasma generator using microwave discharge (col. 2, lines 43-48). Modified Rauschnabel '393 also discloses that in addition to microwave plasma, bias voltages can also either be used in conjunction with the microwave plasma or solely by itself (col. 3, lines 11-16). Modified Rauschnabel '393 further states that "high frequency bias voltages have proven particularly effective in this context (col. 3, lines 16-18).

Response to Arguments

6. The new drawing of figure 3 is accepted and replaces the prior drawing of figure 3. Therefore the objection is withdrawn.

7. Applicant's arguments filed July 26, 2007 have been fully considered but they are not persuasive.

8. On pages 7-8, Applicant argues that the substrate does not rest on an outer cylindrical surface of a substrate holder as it is located on a top surface of a turntable, pointing to figure 1 of the patent application.

Examiner respectfully disagrees. It is noted that the surface of a cylinder includes not only its curved sidewall, but also the flat top and bottom wall. The substrate (part 41) is still on the top, outer surface of the thin cylinder turntable (part 50), thus the substrate

Art Unit: 1753

is on an outer cylindrical surface and is interpreted to be within the claimed language.

Thus, Applicant's claims continue to read upon Rauschnabel et al.

9. On pages 8-9, Applicant's argues that Rauschnabel et al fails to teach an exhaust (i.e. vacuum) port located on the side walls of the chamber and in each deposition area. These arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Art Unit: 1753

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Band whose telephone number is (571) 272-9815. The examiner can normally be reached on Mon-Fri, 8am-4pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

12. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MAB


ALEXA D. NECKEL
SUPERVISORY PATENT EXAMINER